Objective 3.2 – Focus on Robust Science: Refocus and sustain the EPA's focus and commitment to robust research and scientific analysis to inform policy making.

Introduction

EPA will continue to identify, assess, and apply the best available science to address current and future environmental hazards and develop new approaches to improve the scientific foundation for environmental protection decisions. EPA is committed to using science and innovation to reduce risks to human health and the environment and conducts problem-driven, interdisciplinary research to address specific environmental risks in support of the agency's programs and regions. The Office of Research and Development's (ORD) work provides the scientific basis for decisions supporting the Clean Air Act (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Toxic Substances Control Act (TSCA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Oil Pollution Act, Resource Conservation and Recovery Act (RCRA) and more.

Strategy

Air, Climate, and Energy

The Air, Climate, and Energy (ACE) research program will continue to support EPA's mission to protect human health and the environment and fulfill the Agency's legislative mandates through the commitment to provide innovative science and engineering. Specifically, the ACE research program provides critical information needed to improve air quality in the context of stationary source regulations, vehicle and fuel standards and certification, climate protection, and domestic ozone actions. In FY 2018 and beyond, ACE will continue to do the following:

- Assess human and ecosystem exposures and effects associated with air pollutants at individual, community, regional, and global scales.
- Develop and evaluate sound approaches to prevent and reduce pollution, particularly sustainable, cost-effective, and innovative multipollutant and sector-based approaches.
- Provide human exposure and environmental modeling, monitoring, metrics, and information needed to inform air quality decision making at the state and local level.
- Design methods to anticipate and prepare for risks to public health and the environment posed by future technologies, policies, and environmental conditions.

Safe and Sustainable Water Resources

The Safe and Sustainable Water Research (SSWR) research program is developing innovative, cost-effective solutions to current, emerging, and long-term water resource challenges for complex chemical and biological contaminants. The SSWR research program uses a systems approach to develop scientific and technological solutions for the protection of human health and aquatic ecosystems. The research is conducted in partnership with the Office of Water and other EPA programs, federal and state agencies, tribes, local communities, academia, non-governmental agencies, and private stakeholders. During FY 2018 to FY 2022, SSWR will continue to do the following:

- Conduct research and support safe drinking water by focusing on complete water cycle analysis and assess the distribution, composition, and health impacts of known and emerging chemical and biological contaminants.
- Improve methods for fast and efficient waterborne pathogen monitoring in recreational waters.

- Investigate health impacts from exposure to harmful algal/cyanobacteria toxins, and develop innovative methods to monitor, characterize, and predict blooms for early action.
- Support states in prioritizing watersheds for nutrient management and in setting water quality and aquatic life thresholds.
- Assist states, communities, and utilities in addressing stormwater and wastewater infrastructure needs through applied modeling, technical assistance, and capture and reuse risk assessments.
- Provide water reuse research support on potable and non-potable use guidance for states.

Homeland Security

Terrorist attacks, industrial accidents, and natural disasters can result in acutely toxic chemical, biological or radiological (CBR) contamination causing sickness or death, disruption of drinking water and waste water services, economic hardship in communities, and even shutdown of urban areas. The Homeland Security (HS) Research fills critical scientific and technological gaps that enhance EPA's ability to carry out its mandated national preparedness, response, and recovery capability obligations.

HS Research is dedicated to sustaining EPA's focus and commitment to robust research and scientific analysis to inform disaster response and guidance. In FY 2018 and beyond, HS Research will continue to:

- Build upon its record of providing measureable benefits to EPA's program offices and regions, and states and local communities, by supporting EPA's efforts to enhance the nation's resilience to disasters including acts of terror.
- Develop innovative, sound solutions to address wide-area cleanup and water system security to support guidance and response that protect economic, environmental, and social wellbeing.
- Deliver effective tools, methods, and data that EPA and local emergency responders can use to characterize CBR contamination, assess exposure and risks to public health, clean up impacted water systems and urban areas, and improve community resilience.

Sustainable and Healthy Communities

The Sustainable and Healthy Communities (SHC) program supplies research to support regulatory activities, protocol development for the National Contingency Plan, and provides on-demand technical support at federal, Tribal or state-led cleanup sites and during emergencies. Program scientists do health, environmental engineering, and ecological research and translate these into planning and analysis tools for localities throughout the United States to facilitate regulatory compliance and improve environmental and health outcomes. Additional research outcomes include characterization and remediation methods for fuels released from leaking underground storage tanks. In FY 2018 and beyond, SHC will continue to do the following:

- Continue EnviroAtlas, a web-based atlas of ecosystem services
- Evaluate ecosystem services values and links between ecosystem services and human health
- Measure pollution impacts on vulnerable populations such as children
- Provide assistance to regional decision makers in setting science-based cleanup levels that protect human health while reducing cleanup costs

Chemical Safety for Sustainability

The Chemical Safety for Sustainability (CSS) research program provides information, tools, and methods to make better-informed, more-timely decisions about the thousands of chemicals circulating in the United States. CSS products strengthen the Agency's ability to evaluate and predict impacts from chemical use and disposal. The CSS program will continue to produce innovative tools that accelerate

the pace of data-driven evaluations, enable EPA and state decisions to be knowledge-based and public health protective, and advance science required to anticipate and solve problems. CSS is dedicated to sustaining EPA's focus and commitment to robust research and scientific analysis to inform policy making. In FY 2018 and beyond, CSS will do the following:

- Use ToxCast/Tox21 data to develop high-throughput risk assessments, particularly for chemicals for which adequate information has not been available historically to conduct risk assessments.
- Develop on-line software tools to provide information on thousands of chemicals and integrate health, environmental, and exposure data for a range regulatory and prioritization decisions.
- Explore how high-throughput exposure and hazard information can be combined to predict potential for exposure and risk to susceptible subpopulations.
- Continue nanoparticle research by conducting lifecycle analyses, evaluating impacts on ecosystem health, and supporting the development of safer nanomaterials in private industry.
- Focus on endocrine disrupting chemical research to evaluate impacts on vulnerable populations.

Human Health Risk Assessment

The Human Health Risk Assessment (HHRA) research program is focused on the science of assessments that inform decisions made by the EPA and its partners, including states and tribes. HHRA is dedicated to sustaining EPA's focus and commitment to robust research and scientific analysis to inform policy making. During Fiscal Year 2018-2022, HHRA will provide the research and technical support needed to ensure safety of chemicals in the marketplace; to revitalize and return land back to communities; to provide clean and safe water; and to work with EPA and states to improve air quality. Specifically, HHRA will:

- Develop a portfolio of Chemical Evaluation products that optimize the application of best available science for use by states, tribes, EPA and other federal agencies
- Provide research and scientific support for TSCA implementation
- Develop assessment products such as Integrated Risk Information Systems (IRIS), Provisional Peer-Reviewed Toxicity Values (PPRTVs), and advanced exposure assessment tools to help inform Superfund and hazardous waste site cleanups, as required by RCRA and CERCLA.
- Provide scientific support to the Risk and Technology Reviews under the CAA.
- Provide Integrated Science Assessments (ISAs) to support decisions to retain or revise the National Ambient Air Quality Standards (NAAQS). ISAs also inform analyses by state and local officials, including benefit-cost analyses, to support implementation of air quality management programs.
- Provide research and technical support to deliver safe drinking water by focusing on evaluating exposures to and health impacts of known and emerging, chemical and biological contaminants.

External Factors and Emerging Issues

ORD faces a number of risks towards continuing its commitment to conduct robust science, each bearing unique potential impacts. For example, aging information technology infrastructure threatens ORD's information security and impacts the organization's information management capacity. Ensuring public access to ORD research and data threatens to undermine ORD's efforts to work transparently with stakeholders and the public to ensure credibility and integrity. Each of these risks threaten ORD's ability to conduct robust scientific research, and are amplified by diminishing resource and workforce levels. Sustainable resource levels and a strong workforce are critical to continuing the ORD's critical research efforts and mitigating risks across the enterprise.